Data Munging & Reskilling Workshop

Royal Library, Copenhagen, 2015

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Slides & Examples

http://bit.ly/dataMunging

Who is this Christina person

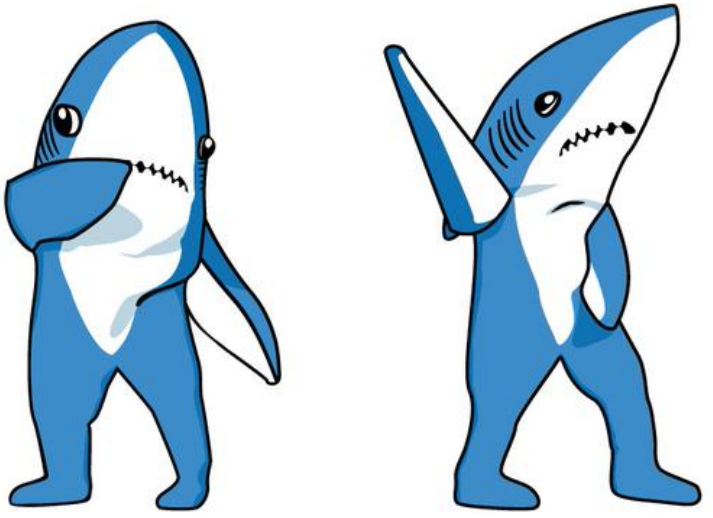
- *Former*: Metadata Specialist, Columbia University
- *Current*: Head of Cataloging & Metadata, University of Tennessee Knoxville
- *Current*: Metadata lead, Digital Library of Tennessee (DPLA Service hub)
- *2016*: Metadata Librarian, Cornell University

Who is this Christina person

Thinks a lot about:

- Cataloger reskilling
- Developer <=> Metadataist bridges
- Library Data Tools
- Side Benefits of Linked Open Data
- christinaharlow.com

Left-sharking It



Right Now

1st hour:

- metadata munging tools, use cases, examples
- changing role of cataloging discussions

2nd hour:

- break outs, more details/help on tools of interest

Use Case 1: What Data Do We Have?

Columbia: Omeka => Hydra, preparing for Voyager => Alma

UTK: at least 4 platforms => Alma, Islandora

DPLA: Aggregating 225000 records from mostly ContentDM, Dspace => Repox (to DPLA)

First question: What does this data look like?

Use Case 1: What Data Do We Have?

Tools:

- UNT Work: Harvester
- UNT Work: Metadata Breakers
- Mark Phillips, *Metadata Analysis at the Command Line*
- Corey Harper, *Can Metadata be Quantified*
- UTK Metadata QA Scripts
- Simple PyMARC Usages

Python

Python = a popular, high-level programming
language used for a variety of purposes.
PyMARC is a Python library helpful for
working with MARC data.

python wiki: https://wiki.python.org/moin/
pymarc: https://github.com/edsu/pymarc

Python Scripting

- Highly customizable for special projects' data
- Works with all types of data through use of libraries
- Runs through larger datasets more quickly
- Requires programming knowledge
- Requires often building scripts locally

Python QA at UTK, DLTN

- UNT-based OAI scripts
- DPLA Json objects review

Python Reports at UTK, DLTN

OAI-DC script excerpt

```
def main():
    stats_aggregate = {
        "record_count": 0,
        "field_info": {}
    }
    element_stats_aggregate = {}

    parser = ArgumentParser(usage='%(prog)s [options] data_filename.xml')
    parser.add_argument("-e", "--element", dest="element",
                        help="element to print to screen")
    parser.add_argument("-i", "--id", action="store_true", dest="id",
                        default=False, help="prepend meta_id to line")
    parser.add_argument("-s", "--stats", action="store_true", dest="stats",
                        default=False, help="only print stats for repository")
    parser.add_argument("-p", "--present", action="store_true", dest="present",
                        default=False, help="print if there is value of defined element in record")
    parser.add_argument("-d", "--dump", action="store_true", dest="dump",
                        default=False, help="Dump all record data to a tab delimited format")
    parser.add_argument("datafile", help="put the datafile you want analyzed here")

    args = parser.parse_args()
```

github.com/cmh2166/metadataQA

Python Reports at UTK, DLTN

OAI-DC script report

```
         {http://purl.org/dc/elements/1.1/}contributor: |====================     |   6528/8101 |  80%
            {http://purl.org/dc/elements/1.1/}coverage: |==============           |   4730/8101 |  58%
             {http://purl.org/dc/elements/1.1/}creator: |======                   |   2162/8101 |  26%
                {http://purl.org/dc/elements/1.1/}date: |====================     |   6517/8101 |  80%
         {http://purl.org/dc/elements/1.1/}description: |===================      |   6272/8101 |  77%
             {http://purl.org/dc/elements/1.1/}format: |========================  |   7721/8101 |  95%
          {http://purl.org/dc/elements/1.1/}identifier: |========================= |   8095/8101 |  99%
{http://purl.org/dc/elements/1.1/}identifier.thumbnail: |========================= |   8086/8101 |  99%
            {http://purl.org/dc/elements/1.1/}language: |====================     |   6543/8101 |  80%
           {http://purl.org/dc/elements/1.1/}publisher: |========                 |   2628/8101 |  32%
            {http://purl.org/dc/elements/1.1/}relation: |========================  |   7666/8101 |  94%
              {http://purl.org/dc/elements/1.1/}rights: |========================= |   8055/8101 |  99%
              {http://purl.org/dc/elements/1.1/}source: |======                   |   2107/8101 |  26%
             {http://purl.org/dc/elements/1.1/}subject: |========================  |   7522/8101 |  92%
               {http://purl.org/dc/elements/1.1/}title: |========================= |   8095/8101 |  99%
                {http://purl.org/dc/elements/1.1/}type: |========================= |   8004/8101 |  98%
                        {http://www.modstest.org/}test: |                         |      1/8101 |   0%


        dc_completeness 82.896762
collection_completeness 77.714943
      wwww_completeness 76.746698
      dpla_completeness 99.761346
   average_completeness 84.279937
```

github.com/cmh2166/metadataQA

OAI-MODS script report

```
                                                  mods:abstract: |======================== | 152698/155164 |  98%
                                               mods:accessCondition: |======================== | 155134/155164 |  99%
                                 mods:extension/{http://purl.org/dc/terms/}available: |================          | 116045/155164 |  74%
                                                       mods:genre: |======================    | 139213/155164 |  89%
                                                  mods:identifier: |======================== | 150219/155164 |  96%
                                        mods:language/mods:languageTerm: |===================     | 127452/155164 |  82%
mods:location/mods:holdingExternal/mods:holding/mods:physicalAddress/mods:text: |                          |   2090/155164 |   1%
       mods:location/mods:holdingSimple/mods:copyInformation/mods:shelfLocator: |                          |    569/155164 |   0%
                                        mods:location/mods:phyiscalLocation: |                          |    279/155164 |   0%
                                        mods:location/mods:physicalLocation: |======================    | 143166/155164 |  92%
                                              mods:location/mods:publisher: |                          |    342/155164 |   0%
                                           mods:location/mods:shelfLocator: |                          |   3581/155164 |   2%
                                                  mods:location/mods:url: |======================== | 155155/155164 |  99%
                                                 mods:name/mods:namePart: |===                       |  23037/155164 |  14%
                                       mods:name/mods:role/mods:roleTerm: |===                       |  23031/155164 |  14%
                                                           mods:note: |=                         |   8054/155164 |   5%
                                         mods:originInfo/mods:dateCreated: |======================    | 146675/155164 |  94%
                                               mods:originInfo/mods:place: |                          |   3307/155164 |   2%
                                           mods:originInfo/mods:publisher: |===================       | 120399/155164 |  77%
                                        mods:part/mods:detail/mods:number: |                          |    219/155164 |   0%
                                mods:physicalDescription/mods:digitalOrigin: |                          |   3094/155164 |   1%
                                       mods:physicalDescription/mods:extent: |===                       |  22235/155164 |  14%
                                         mods:physicalDescription/mods:form: |======================    | 144448/155164 |  93%
                                mods:physicalDescription/mods:internetMediaType: |=======================   | 140894/155164 |  90%
                                       mods:physicalDescription/mods:note: |                          |   3243/155164 |   2%
                 mods:recordInfo/mods:languageOfCataloging/mods:languageTerm: |=========================| 155164/155164 | 100%
                                  mods:recordInfo/mods:recordChangeDate: |=========================| 155164/155164 | 100%
                              mods:recordInfo/mods:recordContentSource: |=========================| 155164/155164 | 100%
                               mods:recordInfo/mods:recordCreationDate: |                          |   2090/155164 |   1%
                                 mods:recordInfo/mods:recordIdentifier: |                          |   2154/155164 |   1%
                                      mods:recordInfo/mods:recordOrigin: |=========================| 155164/155164 | 100%
                                        mods:relatedItem/mods:abstract: |====                      |  29360/155164 |  18%
                                     mods:relatedItem/mods:identifier: |                          |   1267/155164 |   0%
                                mods:relatedItem/mods:location/mods:url: |======================== | 155154/155164 |  99%
                 mods:relatedItem/mods:part/mods:detail/mods:number: |                          |      1/155164 |   0%
                        mods:relatedItem/mods:titleInfo/mods:title: |======================== | 155154/155164 |  99%
          mods:subject/mods:cartographics/mods:coordinates: |====================      | 127769/155164 |  82%
                               mods:subject/mods:geographic: |=======================   | 137056/155164 |  88%
                                        mods:subject/mods:name: |                          |    712/155164 |   0%
                             mods:subject/mods:name/mods:namePart: |                          |   3118/155164 |   2%
                                      mods:subject/mods:temporal: |====================      | 129068/155164 |  83%
                          mods:subject/mods:titleInfo/mods:title: |==================        | 114968/155164 |  74%
                                         mods:subject/mods:topic: |=====                     |  34577/155164 |  22%
                                      mods:subject/mods:topical: |                          |     29/155164 |   0%
                                    mods:titleInfo/mods:nonSort: |                          |     88/155164 |   0%
                                      mods:titleInfo/mods:title: |======================== | 155163/155164 |  99%
                                            mods:typeOfResource: |======================== | 152159/155164 |  98%
```

Python Reports at UTK, DLTN

OAI script field report

```
brighid ~ T metadataQA python oaidc_analysis.py test/output.xml -e format | sort | uniq -c
  82 1 digital image
   2 1 digital image; 1 artifact
   2 1 digital image; 1 beehive
   1 1 digital image; 1 black and white photograph
   4 1 digital image; 1 building
   2 1 digital image; 1 cartoon
   1 1 digital image; 1 cartoon with caption; 15 x 15 inches
   1 1 digital image; 1 cartoon; 5.25 x 10 inches
   2 1 digital image; 1 cartoon; 6.5 x 10 inches
   1 1 digital image; 1 cartoon; 6.75 x 10.75 inches
   1 1 digital image; 1 cartoon; 6.75 x 8.5 inches
   1 1 digital image; 1 cartoon; 7 x 10.5 inches
   1 1 digital image; 1 cartoon; 7 x 11 inches
   1 1 digital image; 1 cartoon; 7 x 11.5 inches
   1 1 digital image; 1 cartoon; 7 x 12 inches
   1 1 digital image; 1 cartoon; 7.25 x 10 inches
   1 1 digital image; 1 cartoon; 8.25 x 12 inches
   1 1 digital image; 1 cartoon; 8.5 x 10.75 inches
   1 1 digital image; 1 cartoon; 8.5 x 11 inches
   1 1 digital image; 1 cartoon; 8.75 x 10.25 inches
   2 1 digital image; 1 certificate
   1 1 digital image; 1 cloth piece
   1 1 digital image; 1 color photograph
   1 1 digital image; 1 desk
   1 1 digital image; 1 diagram
```

github.com/cmh2166/metadataQA

Python Reports at UTK, DLTN

OAIMODS script XPath report

```
brighid ~ T metadataQA python oaimods_analysis.py test/DLTNphase1.mods.xml -x 'mods:originInfo/mods:dateCreated[@encoding="edtf"]' | uniq
1877
uuuu
1877/1878
1876
1843
uuuu
1855
1915
1930
1869
1910
1938
1888
uuuu
1876
1923
1911
1913
1874
1892
1910
1881
1882
uuuu
1861
uuuu
1886
1837/1838
1840-01
1897
1879
```

github.com/cmh2166/metadataQA

Python Reports at UTK, DLTN

DPLA Json objects script excerpt

```
def get_elements(self):
    out = []
    try:
        record = objectpath.Tree(self.elem)
        response = record.execute(self.args.element)
        if response != None:
            if isinstance(response, list):
                for item in response:
                    if isinstance(item, list):
                        for item2 in item:
                            if isinstance(item2, list):
                                for item3 in item2:
                                    out.append((', '.join(item3)).encode("utf-8").strip())
                            elif isinstance(item2, dict):
                                for key3, value3 in item2.iteritems():
                                    out.append((', '.join(value3)).encode("utf-8").strip())
                            else:
                                out.append(item2.encode("utf-8").strip())
                    elif isinstance(item, dict):
                        for key, value in item.iteritems():
                            if isinstance(value, list):
                                for item2 in value:
                                    if isinstance(item2, list):
                                        for item3 in item2:
                                            out.append((', '.join(item3)).encode("utf-8").strip())
                                    elif isinstance(item2, dict):
                                        for key3, value3 in item2.iteritems():
                                            out.append((', '.join(valu3)).encode("utf-8").strip())
                                    else:
                                        out.append(item2.encode("utf-8").strip())
```

Python Reports at UTK, DLTN

DPLA Json objects report excerpt

```
brighid ~ metadataQA python dpla_analysis.py test/dplaafter2020.json -e '$.dataProvider' | sort | uniq -c
   1 Anaheim Public Library
   5 Archives Center - NMAH
   1 Arizona State Library, Archives and Public Records
   7 Banning Library District
   2 Bead Museum
   1 Boston Public Library
  14 Brigham Young University - Harold B. Lee Library
   1 Bryn Mawr College
   1 Cochise County (AZ) Clerk of the Superior Court
  27 Colby College
2778 Cooper Hewitt, Smithsonian Design Museum
 708 Cornell University
  12 Dallas Museum of Art
  20 Deer Valley Rock Art Center
   1 Dorot Jewish Division. The New York Public Library
   4 East Carolina University
 261 Freer Gallery of Art and Arthur M. Sackler Gallery
   2 Georgia State University. Libraries. Special Collections
   1 HathiTrust
  12 Historic Huguenot Street
   1 Hobart and William Smith Colleges. Warren Hunting Smith Library
  12 Idaho Commission for Libraries
   2 Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology
   3 Indiana Memory
  30 Indianapolis Museum of Art
 341 Irma and Paul Milstein Division of United States History, Local History and Genealogy. The New York Public Library
   1 Johnson C. Smith University
  34 Linda Hall Library
   1 Los Angeles Public Library
```

github.com/cmh2166/metadataQA

Use Case 2: Vendor-supplied MARC Review, Enhance

Question: How to get catalogers batch reviewing, enhancing vendor-supplied records?

Use Case 2.5: Adding URIs to MARC

Question: How to get catalogers adding $0 URIs in batch to controlled access points MARC records?

Use Case 2: MARC Review, Enhance

Tools:

MarcEdit = Freely available (but not open source) tool for working with MARC records.

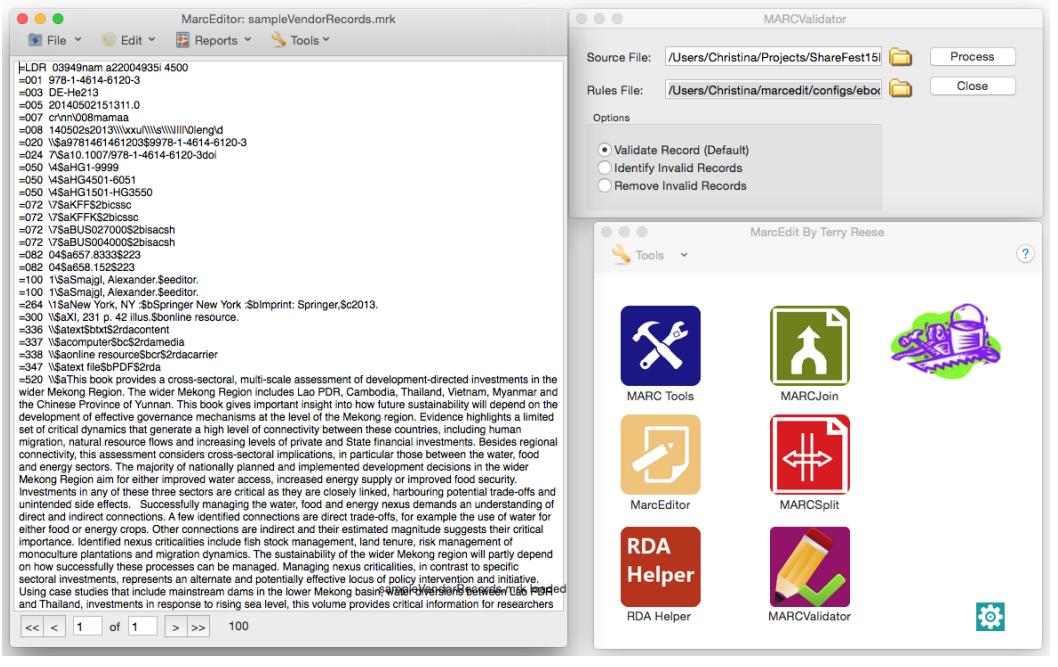
Catmandu MARC Reports

MARCEdit

MarcEdit = Freely available (but not open source) tool for working with MARC records developed and maintained by Terry Reese of Ohio State University.

http://marcedit.reeset.net/

MarcEdit Screenshot



MarcEdit

- Easy to learn
- Work with .mrc, .mrk, or MARC/XML
- Standard conversions
- Validates MARC, RDA Helper
- Generates reports
- Performance issues for bigger (>50k) sets
- Not always/easily customizable

MarcEdit at UTK

- MARCEdit Ebooks Review Workflow
- MARCEdit Next Tools
- Alma Import Profiles, Data Export

Catmandu

Catmandu = data toolkit (command line client and Perl modules) developed as part of the LibreCat project

http://librecat.org/Catmandu/

Catmandu Perl Scripts

- Highly customizable
- Works with all types of data
- Can be part of ETL process with many different data stores, engines, platforms, etc.
- Works well with larger datasets (>100k records)
- Requires some programming knowledge
- Installing Perl, Catmandu & dependencies can be tricky

Catmandu at UTK

- Saved fix routines
- MARC value reports for big sets (when MARCEdit has trouble)

Catmandu at UTK

MARC URI Fix routine excerpt

```
marc_map("001", recordIdentifier)

marc_map("020a",isbn.$append)
join_field(isbn," | ")
split_field(isbn, " | ")

marc_map("245ab",title, join:" ")

# Subject Identifiers?
if marc_match('6**0', "\w+")
  set_field("subjectRecon", "exists")
else
  set_field("subjectRecon", "does not exist")
end

# Name Identifiers?
if marc_match('1**0','\w+')
        set_field("nameRecon", "exists")
else
        set_field("nameRecon", "does not exist")
end

# Primary Name
marc_map('100abcdegq024','primaryName.$append', join:" ")
sort_field('primaryName',-uniq=>1)
```

examples > Catmandu > MARCreconReport.fix

Catmandu at UTK

MARC URI - Fix routine YAML report

```
---
_id: '994790850102311'
addlCorpName:
- Walker & Associates (Memphis, Tenn)
addlName:
- Butcher, Jacob Franklin, 1936-
nameRecon: does not exist
recordIdentifier: '994790850102311'
subjectName:
- Butcher, Jacob Franklin, | 1936-
subjectRecon: does not exist
subjectTopical:
- Advertising,
- Political--Tennessee
title: Jake Butcher for governor
...
---
_id: '991856830102311'
addlCorpName:
- American Animal Hospital Association.
- Pitman-Moore, Inc.
- Tuskegee Institute. School of Veterinary Medicine. Dept. of Radi
addlName:
- Carey, JoAnne.
nameRecon: does not exist
primaryName:
- Hall, Ellis.
recordIdentifier: '991856830102311'
subjectRecon: does not exist
subjectTopical:
- Veterinary
```

examples > Catmandu > MARCreconReport.yaml

Catmandu at UTK

MARC General CSV Report, Fix routine Excerpt

```
  add_field('type','mixed materials')
end
if marc_match("LDR/6","r")
  add_field('type','three-dimensional artifact or naturally occurring object')
end
if marc_match("LDR/6","t")
  add_field('type','manuscript language material')
end

marc_map('020az',isbn.$append, join:' | ')
join_field('isbn', ' | ')

marc_map("035a",sysNumbers.$append, join:' | ')
join_field('sysNumbers', ' | ')

marc_map('100', 'author')

marc_map('110', 'corpAuthor')

marc_map('245ab','title', join:" ")
```

examples > Catmandu > MARCgeneralReport.fix

Catmandu at UTK, DLTN

Fix routine for MARC Report

_id	publisher	statementOfResp	sysNumbers	title	type
994790850102311	Walker & Associates,	by Walker & Associates.	(TU)000479085UTK01 | 504822 | (OCoLC)09379175	Jake Butcher for governor	projected medium
991856830102311	Tuskegee Institute, School of Veterinary Medicine, Dept. of Radiology	Ellis Hall, JoAnne Carey.	(TU)000185683UTK01 | 202056 | (OCoLC)07266005	The use of air as a contrast medium in small animal radiology	projected medium
991262280102311	College of Veterinary Medicine, University of Tennessee,	by Dennis Geiser.	(TU)000126228UTK01 | 139387 | (OCoLC)06969820	Equine laryngostomy and ventriculectomy, and emergency tracheostomy.	projected medium
994938970102311	Warner Home Video,	released by Warner Brothers.	(TU)000493897UTK01 | 520081 | (OCoLC)09452899	Day for night	projected medium
994403500102311	Bailey, Deardourff & Associates?,	Bailey, Deardourff & Associates.	(TU)000440350UTK01 | 464891 | (OCoLC)09208626	Alexander spots	projected medium
994478180102311	King of Video,		(TU)000447818UTK01 | 472632 | (OCoLC)08812014	Elvis in the fifties	projected medium
993287420102311	s.n.,		(TU)000328742UTK01 | 350430 | (OCoLC)08192209	[Kefauver miscellany.	projected medium

`examples > Catmandu > MARCgeneralReport.csv`

Use Case 3: Metadata Worflows

Question: How to handle metadata creation by content specialists, review + enhancement by catalogers, then transform to XML for loading by developers?

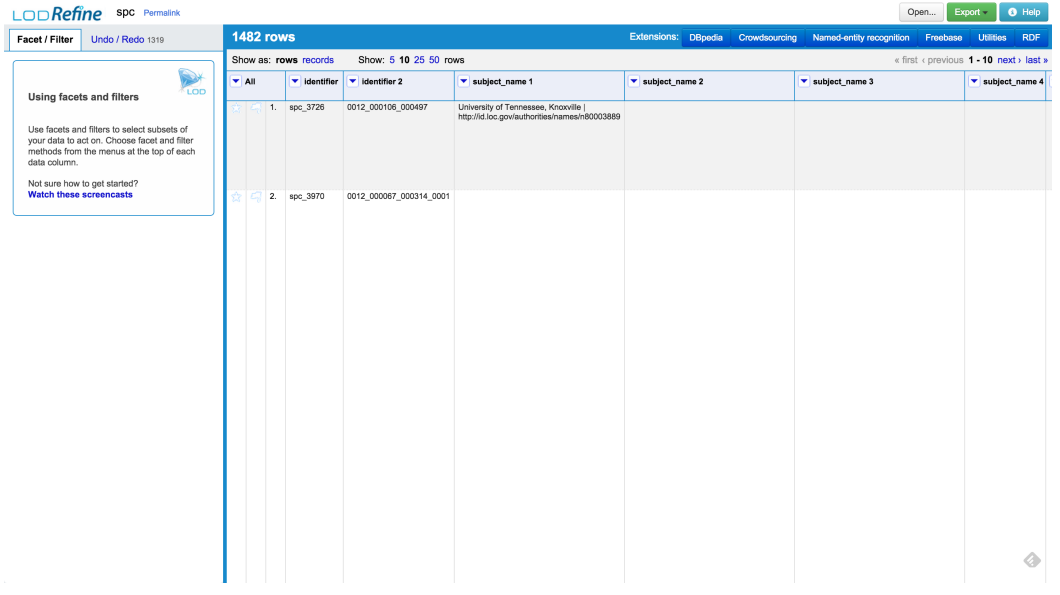
Question: How does the above change for migrations?

Use Case 3: Metadata Workflows

Tools:

- Google Sheets with limited Data Validation
- OpenRefine: Catalogers' Uses & Catalogers' Reskilling
- OpenRefine - Reconciliation and URI, external data retrieval
- Limitations of work currently at UTK
- Digital Library of Tennessee Work

OpenRefine Screenshot



OpenRefine

- Helpful Graphical User Interface for understanding data
- Works with many types of data (better with flatter)
- Faceting, Clustering, GREL, Reconciliation
- Exports a number of formats/encodings
- Performance issues for bigger (>150k) sets

OpenRefine Reconciliation

Reconciliation broadly: Compare values in my dataset with values in an external dataset, if deemed a match, link and pull in external datapoint information

OpenRefine Recon Options

- Add column by fetching URL...
  - HTTP requests to external data API in UI
  - takes far longer to pull data
  - requires parsing returned data with GREL

OpenRefine Recon Options

- Standard Recon Service API
  - RESTful API between OpenRefine and external data
  - requires tinkering knowledge of API building
  - can host for easier use

OpenRefine Recon Options

- DERI RDF Extension
  - no longer actively supported
  - Standard Recon Service API to work with RDF, SPARQL endpoints
  - RDF docs held in memory
  - SPARQL recon dependent on SPARQL server details

Add column by fetching URL...

- 'Edit column' > 'Add column by fetching URLs'
- Give the results column a name
- Enter the GREL to create the API URL query, then 'Add column'
- Wait possibly a very, very long time
- Use GREL on the results column to parse response

Examples: Add column by fetching URL...

- Check 'addcolumnexamples.md' in this workshop's GitHub repo.
- Also review the Mountain West Digital Library workflow using this method with the Geonames API

Standard Recon Service API

OpenRefine Standard Reconciliation Service takes UI data, queries external dataset, then handles ranking, normalization, and returning results to UI.

= HTTP-based RESTful JSON-formatted API connecting OpenRefine to external datasets. This API can be constructed in a number of languages and frameworks.

Originally based off of Freebase extension (no longer working).

Standard Recon Service API Parts

- Recon Service Endpoint
  - GET to send service info to OpenRefine
  - POST to query data API for matches
- Recon Service Metadata
- Entity 'Types'
  - Freebase holdover
- Query/Response Handling
- Other bells and whistles

Recon Service API Metadata

"When a service is called with just a JSONP callback parameter and no other parameters, it must return its metadata as a JSON object literal with at least 3 fields 'name', 'identifierSpace', and 'schemaSpace'. Other fields are optional for reconciliation services which can make use of the default Freebase preview, suggest, etc services, but non-Freebase reconciliation services may need to implement them all."

https://github.com/OpenRefine/OpenRefine/wiki/Reconciliation-Service-API;

API Metadata Example Part 1

```
{
  "name" : "Reconciliation Service Name",
  "identifierSpace" : "http://rdf.freebase.com/ns/some.name.space",
  "schemaSpace" : "http://rdf.freebase.com/ns/type.object.id",
  "view" : {
    "url" : "http://www.externaldatasource.org//{{id}}"
  },
  "preview" : {
    "url" : "http://this-api.freebaseapps.com/preview/{{id}}",
    "width" : 430,
    "height" : 300
  },
```

API Metadata Example Part 2


```
  "suggest" : {
    "type" : {
      "service_url" : "http://this-api.freebaseapps.com",
      "service_path" : "/suggest_type",
      "flyout_service_url" : "http://www.freebase.com"
    },
    "property" : {
      "service_url" : "http://this-api.freebaseapps.com",
      "service_path" : "/suggest_property",
      "flyout_service_url" : "http://www.freebase.com"
    },
    "entity" : {
      "service_url" : "http://this-api.freebaseapps.com",
      "service_path" : "/suggest",
      "flyout_service_path" : "/flyout"
    }
  },
  "defaultTypes" : []
}
```

Query JSON Example

```
{
  "query" : "Kittens",
  "limit" : 3,
  "type" : "/fast/all",
  "type_strict" : "any"
}
```

Reconciled JSON Example

```
{
    "result" : [
      {
        "id" : "http://id.loc.gov/authorities/subjects/sh85072589"
        "name" : "Kittens"
        "type" : "/fast/all"
        "match" : "false"
      },
      ... more results ...
    ]
  }
```

Entity Types

These are the types of entities for reconciliation, usually based on the result

Depends on the service and is optional. Freebase holdover that can be used to access different indexes for an external data API.

Standard Recon Service API Templates

Some wonderful developers made templates in a variety of languages, though python/flask seems to be the language/framework du jour, for folks to plug in external data API information. These will get a basic API service up and running fairly quickly for those with limited programming knowledge or time.

Standard Recon Service Examples

- FAST Reconciliation Service (not hosted, using python)
  - Check 'pythonflaskmarkedupexample.md' in this workshop's GitHub repo.
- LCNAF - VIAF Reconciliation Service (hosted and not hosted, using python)
- VIAF Reconciliation Service Example (hosted, using PHP)
- Basic Python/Flask Template
- Extended Python/Flask Template

DERI RDF Extension Recon

Using this, can reconcile against RDF documents and SPARQL Endpoints.

No longer actively supported.

Use Case 4: Local Authorities

Question: How to get the Great Smoky Mountains Regional Collection as a local authority that effectively extends Geonames, the Library of Congress Authorities?

Use Case 4: Local Authorities

Tools

- LODRefine - Exporting Local Authorities as SKOS RDF
- Skosmos
- SKOSify

Local Authorities Example

```
<http://dots.lib.utk.edu/p54274> <rdfs#type> <skos#Concept> .
<p54274> <skos#prefLabel> "Tellico"@en .
<p54274> <skos#inScheme> <http://dots.lib.utk.edu/DOTS> .
<p54274> <skos#altLabel> "Talequo"@en .
<p54274> <skos#related> <http://id.loc.gov/authorities/names/no94017139> .
<p54274> <skos#related> <http://id.loc.gov/authorities/names/n86034608> .
<p54274> <skos#related> <http://sws.geonames.org/4662016/> .
```

apologies for the invalid/shrunken Ntriples here - this was done just for slide space considerations.

Links & Thank you

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http://bit.ly/dataMunging